

REMARKS

This amendment is in response to the Office Action mailed on April 22, 2003. Claims 1-5 are pending in the application. Claims 1-3 are rejected and Claims 1, 4 and 5 are objected to. Please note that the Examiner indicated on form PTO-326 that Claims 4 and 5 were withdrawn from consideration evidently due to the objection thereto based on the fact that those two claims were multiple dependent claims depending from another multiple claim. Applicants have amended Claims 1-5 and respectfully request reconsideration of the above-referenced application, including the amended Claims 4 and 5.

FIGS. 5a and 5b have been objected to because they lack the designating legend "Prior Art" according to MPEP §608.02(g). Applicants have submitted herein replacements for FIGS. 5a and 5b, correcting the informalities noted by the Examiner and respectfully request reconsideration of the objection thereto.

Figure 3 has been objected to because it contains the unclear text "a hole," "SMN" and "SMX." The Examiner also indicated that it appears in FIG. 3 "that all five slit grooves have the same widths, even though the applicants are claiming larger widths in the regions adjacent to the tightening members, and it is unclear whether or not this "Model Experiment" of FIG. 3 [having] these identical widths is intentional." Applicants have submitted herein a replacement for FIG. 3 deleting the unclear text cited by the Examiner. Changes were not made to the illustration of the width of the slits because Applicants believe that the present illustration of the slits in FIG. 3 are sufficient to one of ordinary skill in the art to understand the invention disclosed and the subject matter claimed. Applicants kindly remind the Examiner that "it is well established that patent drawings do not define the precise proportions of the elements

and may not be relied on to show particular sizes if the specification is completely silent on the issue.” MPEP §2125, citing In re Wright, 569 F.2d 1124,193 USPQ 332 (CCPA 1977). The above-referenced application discloses several embodiments of the invention that include slits having the same widths and other embodiments having widths of different sizes. In addition, the Examiner should note that FIG. 1 does illustrate slits having different widths. Applicants respectfully submit that the replacement for FIG. 3 complies with the requirement of 37 C.F.R. §§1.81, and 1.83, and, based on the foregoing discussion, request that the objections thereto be reconsidered.

FIG. 4 has been objected to because the Examiner asserts that it contains the following unclear text: “A Section between bolts” and “A bolt section.” In addition, the Examiner has requested that the x-axis scale of FIG. 4 be changed such that exact increments of “6” are used and the labeling of the x-axis be revised to include the units thereof. Applicants have submitted herein a replacement for FIG. 4, wherein the asserted unclear text in the legend of that figure has been amended and the units for the x-axis are now indicated. As to the requirement that the x-axis scale of FIG. 4 be changed to show exact increments of 6, Applicants respectfully submit that the present increment of that axis is already a fixed number, i.e., 5.98. Applicants have unsuccessfully tried to locate in the MPEP a requirement that increments in the axis of figures be an exact integer number. Based on the foregoing discussion and the replacement for FIG. 4 submitted herein, Applicants respectfully request that the Examiner reconsider the objection to that figure.

The abstract of the specification was objected to for being more than 150 words. Applicants have herein submitted a revised abstract to comply with that objection and respectfully request withdrawal of the same.

Claims 4 and 5 are objected to under 37 C.F.R. §1.75(c) as being in improper form because a multiple dependent claim can not depend from any other multiple dependent claim. Applicants have amended the dependency of Claims 4 and 5 and herein respectfully request reconsideration of the objections of those two claims under 37 C.F.R. §1.75(c).

Claim 1 is objected to because of several informalities. Applicants have amended Claim 1, including correction of the cited informalities, and respectfully request reconsideration of the objection thereto.

Claims 1 and 3 are rejected under 37 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claiming the subject matter which applicant regards as the invention. Applicants submit that the amendments to Claims 1 and 3 enclosed herein have overcome these rejections under 35 U.S.C. §112, second paragraph, and respectfully request their withdrawal.

Claims 1-3 are rejected under 37 U.S.C. §102(b) as being anticipated by Nakashima et al (U.S. Patent No. 5,207,266, hereinafter "Nakashima"). Applicants respectfully submit that the presently amended Claim 1 of the above-referenced application is not anticipated by Nakashima because each and every element as set forth in that claim is not found, either expressly or inherently described, in the cited reference. The Examiner is kindly reminded that the identical invention must be shown in as complete detail as is contained in the claim.

According to a feature of the invention as set forth in the presently amended Claim 1, a build-up mold for continuous casting includes a cooling plate with slit grooves for passing a cooling fluid, a supporting panel to cover the slit grooves so as to form cooling channels, and at least one tightening member for attaching the supporting panel to the cooling plate, wherein each one of the cooling channels is

separate, distinct, and unconnected from, and has substantially the same depth as, the other cooling channels, and the width of the cooling channels varies based on a localized cooling requirement for the tightening member.

As disclosed in the Specification, such a build-up mold can be produced at a much lower cost by simplifying cumbersome positioning operations when milling or cutting the slit grooves, and is capable of maintaining a uniform cooling efficiency over the entire cooling plate by adjusting the pressure loss and coolant flow rate in each of the slit grooves, thus minimizing or eliminating break-out and defects of molded pieces in the continuous casting of molten metal without generating strains in the cooling plate and increasing the yield of molded pieces (Specification, page 7, lines 5-17). Claim 1 has been amended to more clearly recite such a build-up mold.

Nakashima describes a water-cooled casting mold comprised of a maze of main channels 2a interposing bolt screwing holes 5a there between and branching portions 2c formed widely at both ends and the central portions of the main channels 2a. Increased channels 2b are also provided at the central portion between the main channels 2a and the adjoining bolt screwing holes 5a and extend disposed in parallel with the main channels 2a. Branch channels 2d are also disclosed, extending from branching portions 2c to the increased channels 2b (Nakashima, col. 3, lines 9-20). Various widths and depths are disclosed to the different channels making up the Nakashima's cooling maze.

Applicants respectfully submit that Claim 1 is not anticipated by Nakashima. This cited prior art reference does not disclose cooling channels that are separate, distinct, and unconnected from, and has substantially the same depth as, the other cooling channels, wherein the width of the individualized cooling channels varies based on a localized cooling requirement for the tightening member. In addition,

Claims 2-5 are allowable, among other reasons, as depending either directly or indirectly from Claim 1, which is allowable. Therefore, Applicants respectfully request that the anticipation of Claims 1-5 under 37 U.S.C. §102(b) be withdrawn and the claims passed to issuance.

Furthermore, Claim 1 is also not rendered obvious by Nakashima. Nakashima discloses the use of more channels and interconnected sub channels in order to better cool locations around the tightening members. Based on that teaching, one of ordinary skill in the art would not be lead to reduce the number of channels and to completely eliminate the interconnection between main channels and sub channels as recited in the instant invention. In other words, the complicated maze of channels in Nakashima, with all of its sharp corners and unnecessary changes in flow area, which require a higher pumping power as the number of sub channels increase, teaches away from the present invention because of the reduced pumping power associated with the unconnected nature of the slit grooves. That is, for a given overall pressure drop and equivalent flow areas, the present invention will provide more cooling because of the increased flow rate associated with the reduction in flow losses. Conversely, given a desired amount of cooling and equivalent flow areas, the build-up mold of the present invention will achieve the target cooling using less pumping power than Nakashima's cooling maze.

Based at least on the foregoing reasons, Applicants believe the present application is in condition for allowance and respectfully solicit an early Notice of Allowability.

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Reply to the Office Action of April 22, 2003

Finally, the attention of the Patent Office is directed to the change of address of Applicants' representative, effective January 6, 2003:

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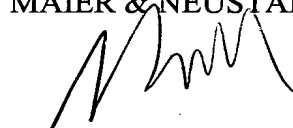
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Please direct all future communications to this new address.

Respectfully submitted,

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